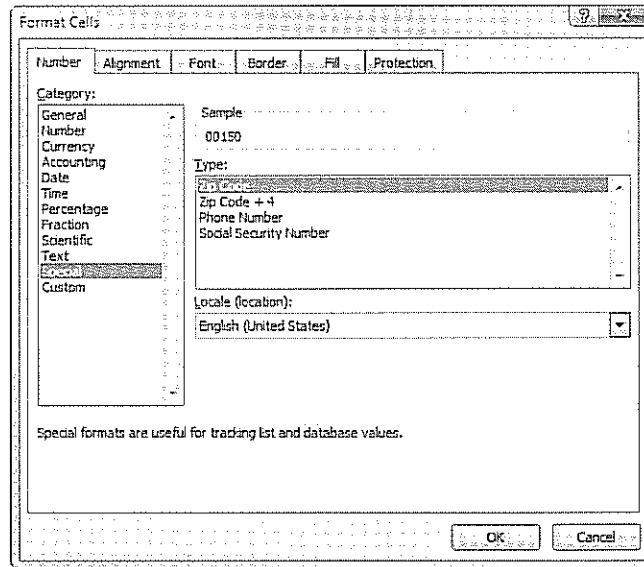


Figure 19.8
The special category formats are lifesavers when you need to enter ZIP Codes, phone numbers, and social security numbers.



SETTING DATE AND TIME FORMATS

Normally, Excel stores exactly what you type into a cell. That's not the case when you type a recognizable date or time, however; when storing date and time information, Excel first converts the value you enter into *Serial Date format*. This numeric transformation explains how Excel can perform calculations using date and time information. Understanding the following facts is crucial to working effectively with Serial Date formats:

- Excel converts the date to a whole number that counts the number of days that have elapsed since January 1, 1900. Thus, the serial date value of December 31, 2008 is 39813.
- When you enter a time (hours, minutes, and seconds), Excel converts it to a fractional decimal value between 0 (midnight) and 0.999988 (11:59:59 p.m.). If you enter a time of 10:00 a.m., for example, Excel stores it as 0.416667.
- If you combine a date and time, Excel combines the serial date and time values. Thus, Excel saves December 31, 2008 10:00 a.m. as 39813.42.

NOTE

When you enter only a date, Excel converts it to a serial value and uses 0 (or 12:00 a.m.) as the time value. If you enter only a time, Excel tacks on a date value of 1; if you later format this cell to show the date and time, Excel displays the nonsense date 1/0/1900.

The transformation to a serial value happens as soon as you enter a date or time value in a cell. At the same time, Excel automatically applies the default Date or Time format to your cell so that the data you enter displays correctly. You can choose a different Date or Time

format to change the display format of date or time values. If you change the format of the cell to General or Number, however, you will see the serial values instead of the dates you expect.

Conversely, if you accidentally apply the Date format to a cell that contains a number, the result is likely to be nonsense, especially if the number is relatively low. Choose the General or Number format to display the cell's contents correctly.

TIP FROM

EQ & Woody

If the display of dates is important to you, be aware of the unusual interaction between Excel's date and time formats and those you define in Windows's Clock, Language, and Region group (in some Windows versions, this appears as Regional Settings or Regional Options). These linked formats appear at the top of the Date and Time lists in the Format Cells dialog box, with an asterisk in front of the format. When you change the date format in Windows, the format in your worksheet changes, too—if you've used one of these formats.

Excel transforms dates and times to serial values so that you can use them in calculations. Because date and time values are stored as numbers, you can easily enter formulas that calculate elapsed time. If you include an employee's hire date as part of a list, for instance, you can use a simple formula to compare that value to today's date and determine whether the employee has qualified for participation in a profit-sharing or stock-option program. If you enter start and end times for each participant in a road race, you can easily calculate the total elapsed time and determine the top finishers.

After you enter the employee's start date in C1 and your report date in C2, for example, you can calculate the difference between the two dates by using the formula `=C1 - C2`.

TIP FROM

EQ & Woody

Unfortunately, Excel outsmarts itself when you use this type of formula. Because it sees dates in both cells used in the formula, it automatically applies a date format to the cell containing the formula. As a result, the cell contents display as a nonsense date. Reset the cell's format to General or Number to correctly display the difference between the dates.

To use a date directly in a formula, enclose it in quotation marks first: `=Today() - "1/1/2008"` counts the number of days that have elapsed since January 1, 2008, for instance.

NOTE

Excel's Options dialog box's Advanced group includes the Use 1904 date system. This obscure option is necessary only when exchanging files with users of old versions of Excel for the Macintosh, which started the calendar at the beginning of 1904 rather than 1900. Mac Excel versions since including Excel 98 handle this conversion seamlessly. Under normal circumstances, you should never need to use this option.

EXCEL AND YEAR 2000 ISSUES

The much-feared global Y2K crisis never happened. Planes continued to fly, power stations hummed along, and banks didn't run out of money. Yes, the world successfully entered the new millennium, but that doesn't let you off the hook when it comes to Year 2000 (Y2K) issues. Excel's default settings correctly handle most formulas that include dates from different centuries. But a few "gotchas" linger for the unwary:

- When you enter a date before January 1, 1900 in an Excel worksheet, the date appears as text. As far as Excel is concerned, dates before the 20th century simply don't exist—that's bad news for historians and scientists hoping to use Excel to plot dates that go back more than a century.
- On the other hand, dates after December 31, 1999 don't represent a problem. In fact, Excel worksheets will accept any date through December 31, 9999 (that's a serial date value of 2958465, if you want to try it for yourself).

TIP FROM



If you need to track timelines and perform calculations for dates before the beginning of 1900 (to chart long-term records of earthquake activities, for example), don't use Excel. Instead, fire up Access, which can correctly handle dates as early as January 1, 100 (Common Era). If you're a student of ancient history, you'll need to use another program—or perhaps you can make do with clay tablets.

Because Excel stores dates as serial values, it is unaffected by most garden-variety Y2K problems. In practice, however, you might encounter Y2K problems if you enter or import data that includes only two digits for the year. When Excel encounters dates in this format, it has to convert the year to four digits; in the process, it's possible to select the wrong century. When translating two-digit years, Excel uses the following rules:

- Excel automatically converts dates entered using the two-digit years 00 through 29 to the years 2000 through 2029. Thus, if you enter or import the value 5/23/08, Excel stores it as serial value 39591, or May 23, 2008.
- When you enter the two-digit years 30 through 99 as part of a date, Excel converts the dates using the years 1930 through 1999. Thus, when you enter or import the value 9/29/55, Excel stores it as serial value 20361, or September 29, 1955.

On a new worksheet, Excel automatically displays dates using a four-digit format. However, if you design a worksheet so that some dates display only two years (or if you use an older worksheet that was designed using those formats), you might not realize that Excel has stored the wrong data. In that case, any calculations you make might be off by a full century. To avoid inadvertently entering or importing incorrect data, get in the habit of entering all dates using four-digit formats for the year: 5/23/2008. Excel stores this date correctly regardless of the Date format you've chosen for display purposes.

When importing data that includes dates with two-digit years, check the format of the original data carefully. You might need to manually edit some dates after importing. Pay special

nge the format of the
ead of the dates you

ains a number, the
v. Choose the General

ual interaction between
s Clock, Language, and
nal Settings or Regional
d Time lists in the Format
u change the date for-
ou've used one of these

em in calculations.
er formulas that calcu-
t, for instance, you can
ne whether the
tion program. If you
sily calculate the total

C2, for example, you
a =C1 -C2.

mula. Because it sees
date format to the cell
ionsense date. Reset
ference between the

"Today()" - "1/1/2008"
instance.

14 date system. This
s of old versions of
ng of 1904 rather than
ersion seamlessly.
ption.

attention to worksheets that were originally created using pre-2000 versions of Excel for Windows or the Macintosh, because the algorithms those programs use to convert two-digit years are different from those in Excel 2000 and later versions.

The automatic date conversion routine is a clever workaround, but don't rely on it. Entering or importing two-digit years is guaranteed to cause problems in the following circumstances:

- In the banking industry, in which dates beyond 2029 are common in 30-year mortgages that begin in the year 2000 or later. If you enter the start date as 2/1/08 and the end date as 2/1/38, your loan will start out 70 years overdue.
- In any group that includes milestone dates—birthdays, graduation dates, and so on—for an older population. If you enter a birth date of 6/19/27, your worksheet might assume that the person in question isn't born yet.

TIP FROM

EQ d'Woody

This can't be said strongly enough or repeated too often: Get in the habit of using four-digit years whenever you enter or display a date in a worksheet.

CREATING CUSTOM CELL FORMATS

If the exact number format you need isn't in Excel's collection of built-in formats, create a custom format. Custom formats let you specify the display of positive and negative numbers as well as zero values; you can also add text to the contents of any cell.

TIP FROM

EQ d'Woody

Excel saves custom number formats in the workbook in which you create them. To reuse formats, add them to the template on which you base new workbooks. To copy cell formats from one workbook to another, copy the cell that contains the custom format, click in the workbook where you want to add the format, and choose Paste Special from the Home ribbon's Paste button.

The list of 35 custom formats in the Type box includes some that are already available within other categories, as well as a few you won't find elsewhere. It's almost always easier to design a custom format if you start with one that already exists. To create a custom number format, open the Format Cells dialog box and choose the format you want to start with. Then click Custom at the bottom of the Category list. Excel displays the codes for the format you just selected in the Type box, ready for you to modify. The example shown in Figure 19.9, for example, shows the results when we chose a Currency format and changed the symbol from the U.S. dollar sign to the Euro. Although the switches for these codes are undocumented, this technique adds them to the Type box, making it easy to define a new format that uses this symbol correctly.